



# Effectiveness of COVID-19 Vaccines During Pregnancy and After Delivery

## The Issue

SARS-CoV-2 infection during or immediately after pregnancy is associated with adverse outcomes for both mother and infant. COVID-19 vaccination is recommended for all people 6 months of age and older, including people who are pregnant or recently pregnant. As of July 2023, only 16% of pregnant people had received the recommended bivalent vaccine dose during or before pregnancy.<sup>1</sup>

## Sound Bites

- > People who are pregnant or were recently pregnant are more likely to get severely ill from COVID-19 disease compared with people who are not pregnant.
- > Severe illness means that people sick with COVID-19 disease may need to be hospitalized or admitted to an intensive care unit (ICU). They may need a ventilator or special equipment to help them breathe, and they may die due to COVID-19 disease.
- > People sick with COVID-19 disease during pregnancy are more likely to experience complications that can threaten their pregnancy and developing baby compared with people without COVID-19 disease during pregnancy. For example, COVID-19 disease during pregnancy increases the risk of delivering an infant preterm (earlier than 37 weeks).
- > COVID-19 vaccination is recommended for everyone 6 months of age and older, including people who are pregnant or recently pregnant.
- > Getting a COVID-19 vaccine can help protect people and their babies from serious health problems due to COVID-19 disease.
- > COVID-19 vaccination during pregnancy is safe. All the evidence so far shows that COVID-19 vaccination does not cause problems for pregnant people or their babies.
- > By getting a COVID-19 vaccine while pregnant, protective antibodies will be passed along to the baby through the placenta. These antibodies can help protect the baby from COVID-19 disease during the first few months of infancy.
- > COVID-19 vaccines do not cause COVID-19 disease in people who are pregnant or in their babies.



## Effectiveness of COVID-19 Vaccines During Pregnancy and After Delivery

### Questions for Exploring Patient Concerns

- > What do you know about the risks of getting COVID-19 disease during pregnancy?
- > What do you know about how a COVID-19 vaccine can help protect you and your baby from serious health problems from COVID-19 disease?
- > What is your biggest concern about getting a COVID-19 vaccine during pregnancy?
- > What would need to be true for you to feel comfortable getting a COVID-19 vaccine while you are pregnant?

### What We Know

People who are pregnant or recently pregnant (within 42 days after the end of pregnancy) are among the groups recognized by the Centers for Disease Control and Prevention (CDC) as being at increased risk of serious COVID-19 disease.<sup>2,3</sup> This includes an increased risk of severe illness, hospitalization, ICU admission, need for mechanical ventilation and ventilatory support, and death.<sup>4,5,6</sup> The risk is further increased if other underlying medical conditions (e.g., obesity, diabetes, hypertension, cardiovascular disease) are present.<sup>2,4,7</sup>

There also is increasing evidence that SARS-CoV-2 (COVID-19) infection at any time during pregnancy increases the risk of neonatal morbidity. Recent results from a sequential, prospective meta-analysis showed that neonates born to women with SARS-CoV-2 infection were more likely to be<sup>6</sup>:

- > Admitted to a neonatal care unit after birth.
- > Born preterm (<37 weeks) or very/moderately preterm (<34 weeks).
- > Born at a low birth weight (<5.5 lb).

In contrast with previous reports, this meta-analysis did not find a link between SARS-CoV-2 infection and an increased risk of stillbirth at or beyond 28 weeks gestation.<sup>8,9</sup>

An emerging concern is the potential impact of gestational exposure to SARS-CoV-2 (COVID-19) on child development and behavior. Although a rapid systematic review of 10 primary studies did not find sufficient evidence to confirm an association with neurodevelopmental delays, the associated meta-analysis of three studies indicated that gestational exposure to the virus negatively affected fine motor and problem-solving skills.<sup>10</sup>

Both the CDC and the American College of Obstetricians and Gynecologists (ACOG) recommend COVID-19 vaccination for pregnant and recently pregnant people. As of June 2023, this recommendation is for a single dose of updated (bivalent) mRNA vaccine, regardless of whether a person received any original COVID-19 vaccines.<sup>11</sup> The ACOG Practice Advisory states that vaccination may occur in any trimester, and emphasis should be on vaccination as soon as possible to maximize maternal and fetal health.<sup>5</sup> COVID-19 vaccines may be administered simultaneously with other vaccines routinely administered during pregnancy, such as influenza vaccine and tetanus-diphtheria-acellular pertussis (Tdap) vaccine.<sup>5</sup>

## Effectiveness of COVID-19 Vaccines During Pregnancy and After Delivery

COVID-19 vaccination during pregnancy is effective.<sup>11</sup> In the INTERCOVID-2022 Study—during a 7-month period when Omicron (B.1.1.529) was the variant of concern—vaccine effectiveness to prevent serious COVID-19 disease (severe symptomatic COVID-19, referral for higher care, ICU admission, or death) in pregnant women was 76% (95% CI, 47–89) among all women who had received a bivalent mRNA booster and 81% (95% CI, 47–89) among women who had received only mRNA vaccines before the booster dose.<sup>12</sup> For women with diagnosed COVID-19 disease, effectiveness against progression to serious disease was 91% after a bivalent booster dose.

The benefits of COVID-19 vaccination during pregnancy extend to infants younger than 6 months of age (i.e., infants who are too young to be vaccinated). In a large multicenter study that used a case-control, test-negative design, maternal vaccination reduced the risk of hospitalization for COVID-19, including for critical illness, among infants younger than 6 months of age.<sup>13</sup>

Evidence continues to build showing that COVID-19 vaccination during pregnancy is safe.<sup>14</sup> A recent systematic review and meta-analysis that included 61 clinical and preclinical studies involving more than 17.7 million pregnant persons found no significant association (either clinically or statistically) with adverse maternal or fetal effects, regardless of the vaccine or the trimester of vaccination.<sup>15</sup>

## References

1. Centers for Disease Control and Prevention. COVID data tracker. Accessed July 1, 2023. <https://covid.cdc.gov/covid-data-tracker/#vaccinations-pregnant-women>
2. Centers for Disease Control and Prevention. Underlying medical conditions associated with higher risk for severe COVID-19: information for healthcare professionals. Updated February 9, 2023. Accessed June 5, 2023. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/underlyingconditions.html>
3. Centers for Disease Control and Prevention. People with certain medical conditions. Updated May 11, 2023. Accessed June 5, 2023. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html>
4. Centers for Disease Control and Prevention. Pregnant and recently pregnant people at increased risk for severe illness from COVID-19. Updated October 25, 2022. Accessed June 5, 2023. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/pregnant-people.html>
5. American College of Obstetricians and Gynecologists' Immunization, Infectious Disease, and Public Health Preparedness Expert Work Group; Riley LE, Beigi R, Jamieson DJ, et al. COVID-19 vaccination considerations for obstetric–gynecologic care. ACOG Practice Advisory. December 2020. Updated May 12, 2023. Accessed June 5, 2023. <https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2020/12/covid-19-vaccination-considerations-for-obstetric-gynecologic-care>
6. Smith ER, Oakley E, Grandner GW, et al.; Perinatal COVID PMA Study Collaborators. Adverse maternal, fetal, and newborn outcomes among pregnant women with SARS-CoV-2 infection: an individual participant data meta-analysis. *BMJ Glob Health*. 2023;8(1):e009495. doi: 10.1136/bmjgh-2022-009495

## Effectiveness of COVID-19 Vaccines During Pregnancy and After Delivery

7. Smith ER, Oakley E, Grandner GW, et al. Clinical risk factors of adverse outcomes among women with COVID-19 in the pregnancy and postpartum period: a sequential, prospective meta-analysis. *Am J Obstet Gynecol.* 2023;228(2):161–177. doi: 10.1016/j.ajog.2022.08.038
8. Allotey J, Stallings E, Bonet M, et al.; PregCOV-19 Living Systematic Review Consortium. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. *BMJ.* 2020;370:m3320. doi: 10.1136/bmj.m3320. Update in: *BMJ.* 2022;377:o1205. doi: 10.1136/bmj.o1205
9. Centers for Disease Control and Prevention. COVID-19 during pregnancy. Updated July 1, 2022. Accessed June 5, 2023. <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/special-populations/pregnancy-data-on-covid-19/what-cdc-is-doing.html>
10. Pinheiro GSMA, de Souza RC, de Oliveira Azevedo VMG, et al. Effects of intrauterine exposure to SARS-CoV-2 on infants' development: a rapid review and meta-analysis. *Eur J Pediatr.* 2023;182(5):2041–2055. doi: 10.1007/s00431-023-04910-8
11. Centers for Disease Control and Prevention. Stay up to date with COVID-19 vaccines. Updated June 5, 2023. Accessed June 5, 2023. <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html>
12. Villar J, Soto Conti CP, Gunier RB, et al.; INTERCOVID-2022 International Consortium. Pregnancy outcomes and vaccine effectiveness during the period of omicron as the variant of concern, INTERCOVID-2022: a multinational, observational study. *Lancet.* 2023;401(10375):447–457. doi: 10.1016/S0140-6736(22)02467-9
13. Halasa NB, Olson SM, Staat MA, et al.; Overcoming Covid-19 Investigators. Maternal vaccination and risk of hospitalization for Covid-19 among infants. *N Engl J Med.* 2022;387(2):109–119. doi: 10.1056/NEJMoa2204399
14. Centers for Disease Control and Prevention. COVID-19 vaccines while pregnant or breastfeeding. Updated October 20, 2022. Accessed June 5, 2023. <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/pregnancy.html>
15. Ciapponi A, Berrueta M, Parker EPK, et al. Safety of COVID-19 vaccines during pregnancy: a systematic review and meta-analysis. *Vaccine.* 2023;41(25):3688–3700. doi: 10.1016/j.vaccine.2023.03.038

